

REMARKS

Claims 20, 23-28, 31-44, 50, 64-68 and 89-92 are pending. Claims 21-22 have been canceled without prejudice. Claims 20, 23-24, 31-32, 36 and 64 have been amended without prejudice or disclaimer of any previously claimed subject matter. Claims 91-92 are new. No new matter is added by the amendments.

Claims 20 and 23 have been amended to recite 2-C-methyl-D-ribo-lactone and claim 20 has also been further amended to recite 2-C-methyl-ribofuranose. Support for these amendments is found in Examples 1-3 of the specification at pages 54-57.

Claims 24, 31 and 64 have been amended to correct typographical errors.

Claim 32 has been amended to recite "of step (a)." Support for this amendment is found in original claim 20 and in the specification at page 39, lines 1-3.

Applicants respectfully request reconsideration of the pending rejections based on the amendments and the following comments.

Claims Rejections under 35 U.S.C. § 112, First Paragraph

Claims 20-35 stand rejected under 35 U.S.C. § 112, first paragraph because the specification allegedly does not reasonably provide enablement for the preparation of a ribofuranose from any cyclic ether. (Office Action, page 2). Applicants respectfully disagree.

Factors to be considered in determining whether a disclosure meets the enablement requirement have been set forth in *In re Wands*, 8 U.S.P.Q.2d 1400, 1404 (Fed. Cir 1988). They include (1) the nature of the invention, (2) the state of the prior art, (3) the predictability or lack thereof in the art, (4) the amount of direction or guidance presented, (5) the presence or absence of working examples; (6) the breadth of the claims, (7) the quantity of experimentation necessary, and (8) the level of skill in the art. The initial burden is on the Office to provide evidence of non-enablement for each of these factors. (See M.P.E.P. at §§ 2164.01(a); 2164.04; *In re Wands*, 8 U.S.P.Q.2d at 1404.).

Claim 20 as currently amended recites, *inter alia*, a process for the preparation of a ribofuranose from D-fructose. Examples 1-3 of the specification demonstrate a process of preparing a ribofuranose from D-fructose. (Specification, pages 54-57). Furthermore, the Examiner admits that the specification is "enabling for the preparation of ribofuranose from D-fructose...." (Office Action, page 2). Therefore, claim 20 is enabled. Claims 23-28 and 31-35 all depend from claim 20. Applicants respectfully request that the rejection of claims 20-35

under 35 U.S.C. § 112, first paragraph be withdrawn.

Claims Rejections under 35 U.S.C. § 112, Second Paragraph

Claims 20-35 stand rejected under 35 U.S.C. § 112, second paragraph as indefinite because a “cyclic ether containing a hydroxyl and a CH₂OH on the carbon adjacent to the ring oxygen” will allegedly not lead to a “furanose product.” (Office Action, pages 4-5). Without prejudice or disclaimer of any previously claimed subject matter, claim 20 has been amended to cancel these terms. Therefore, the rejection of claim 20 is moot. Claims 23-28 and 31-35 all depend from claim 20. Applicants respectfully request that the rejection of the instant claims under 35 U.S.C. § 112, second paragraph be withdrawn.

Obviousness-Type Double Patenting Rejection

Claims 20-28, 36, 50 and 64-67 are rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claims 1-2 of copending U.S. Patent Application No. 10/882,893. Applicants request deferral of this issue until an indication of allowable subject matter in each application.

Claims Rejections under 35 U.S.C. § 103

The Examiner has rejected claims 20-28, 31-44, 50, 64-68 and 89-90 under 35 U.S.C. § 103(a) as allegedly obvious over BeMiller, *et al.* (“BeMiller”) in view of the Merck Index (“Merck”), Sundberg, *et al.* (“Sundberg”), McFarlin, *et al.* (“McFarlin”) and Piccirilli, *et al.* (“Piccirilli”). The Examiner alleges that the instant claims are obvious because BeMiller teaches the conversion of D-fructose to 2-C-methyl-D-ribonolactone with aqueous calcium hydroxide, Merck teaches that CaO in water forms aqueous calcium hydroxide, Sundberg teaches that an alkoxyaluminum hydride reagent can be used to reduce a lactone carbonyl group to an alcohol, McFarlin teaches that LiAl(O^tBu)₃H is a mild reducing agent, and Piccirilli teaches a benzoyl derivative of a ribofuranose. (Office Action, page 8). Applicants respectfully disagree.

The U.S. Supreme Court has recently addressed the test for obviousness under 35 U.S.C. § 103. *KSR International Co. v. Teleflex Inc.*, No. 04-1350, 550 U.S. __ (2007). In *KSR*, the Supreme Court rejected the Federal Circuit's *rigid application* of the “teaching, suggestion, motivation” test (“the TSM test”) in determining obviousness in the particular case in question. *Id.*, *slip op.* p. 11. According to the Supreme Court, the correct standard to apply is set forth in *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966). *Id.*, *slip op.* p. 2. However, the

KSR decision indicated that while the TSM test is not the sole method for determining obviousness, it may still be a factor. *Id. slip op.* p. 14 (“When it first established [the TSM test], the Court...captured a helpful insight.”). Indeed, on May 3, 2007, the Deputy Commissioner of Patents circulated a memorandum (“USPTO Memorandum,” copy enclosed) to the Technology Center Directors pointing out that the TSM test was not completely abolished in *KSR*.

The *Graham* factual inquiries, which establish a guide for determining obviousness, are: (1) determine the scope and contents of the prior art; (2) ascertain the differences between the prior art and the claims at issue; (3) resolve the level of ordinary skill in the pertinent art; and (4) evaluate any evidence of secondary considerations. *KSR, slip op.* p. 2 (citing *Graham*, 383 U.S. at 15-17).

The instant claims are not obvious because the references cited by the Examiner differ substantially from the subject matter of the instant claims. Furthermore, the scope and content of the references cited by the Examiner do not provide a reason that would have prompted one of ordinary skill in the art to combine the teachings of the references cited by the Examiner to arrive at the processes of the instant claims.

A. The processes of the instant claims differ substantially from that of BeMiller in view of Merck.

First, the instant claims are not obvious over the combination of references cited by the Examiner because they differ substantially from the process of BeMiller in view of Merck.

In *KSR*, the Supreme Court noted the significance of the specific facts in question. Indeed, the District Court found that the invention at issue was simply a combination of two known elements from the prior art. *KSR, slip op.*, p. 20. Once these specific findings were made, the Court then determined whether it was obvious to combine the teaching of the prior art to arrive at the claimed invention. *Id.* Thus, the threshold issue to be resolved is the differences between the claims at issue and the prior art.

This case is not a simple combination of two known elements. Indeed, the Examiner has cited no less than five references to allege that the instant claims are obvious. Further, each element of the instant claims is not taught by the references cited by the Examiner. The claims at issue relate to a novel process for the preparation of 2-C-methyl-D-ribo-lactone from D-fructose using a series of steps, all of which are not taught by BeMiller, Merck, or any other reference cited by the Examiner.

As the Examiner admits, BeMiller does not disclose the use of CaO (Office Action, page 8). Further, the process of BeMiller does not include the step of adding CaO to a solution of D-

fructose as recited in the instant claims. Merck does not cure this defect. Merck merely discloses that when CaO is dissolved in water, aqueous calcium hydroxide results. Thus, an element of the instant claims— the step of adding CaO to a solution of D-fructose— is absent from BeMiller in view of Merck.

B. The processes of the instant claims differ substantially from that of Sundberg in view of McFarlin.

The Examiner alleges that Sundberg discloses the reduction of a lactone carbonyl group to an alcohol group using an alkoxyaluminum hydride reagent. (Office Action, page 8). The Examiner admits that the reducing agent is not $\text{LiAl}(\text{O}^i\text{Bu})_3\text{H}$. *Id.* Furthermore, the lactone-containing compound reduced in the reaction of Sundberg is structurally dissimilar to 2-C-methyl-D-ribonolactone— the lactone reduced in the processes of the instant claims. McFarlin does not cure this defect, as it merely teaches that $\text{LiAl}(\text{O}^i\text{Bu})_3\text{H}$ is a mild reducing agent soluble in a variety of solvents. Thus, an element of the instant claims, the step of reacting 2-C-methyl-D-ribonolactone with a reducing agent, is not disclosed in the references cited by the Examiner.

Furthermore, the mere fact that Sundberg in view of McFarlin teaches the reduction of a lactone using $\text{LiAl}(\text{O}^i\text{Bu})_3\text{H}$ does not render the instant claims obvious. Alleged obvious differences in specific chemical structures must be adequately supported in the prior art. *See* MPEP § 2144.09, citing *In re Grabiak*, 769 F.2d 729, 731-32, 226 U.S.P.Q. 871 (Fed. Cir. 1985). In *Grabiak*, the Court held that the substitution of a thioester group for an ester group was not suggested by the prior art because “[t]he PTO cited no pertinent reference *showing or suggesting* to one of ordinary skill in the art the change of a thioester for an ester group.” 769 F.2d at 731-32 (emphasis added). The Court held that there was no evidence that the modification from ester to thioester— the substitution of a single atom— was obvious. *Id.*

Substantial differences exist between the structure of 2-C-methyl-D-ribonolactone and the lactone of Sundberg. The Examiner has not put forth any prior art reference showing or suggesting to one skilled in the art that the process of Sundberg in view of McFarlin may be successfully applied to 2-C-methyl-D-ribonolactone. Therefore, because substantial differences exist between 2-C-methyl-D-ribonolactone and the lactone of Sundberg, the instant claims are not obvious.

C. Piccirilli does not cure the defects of BeMiller, Merck, Sundberg and McFarlin.

The Examiner states that Piccirilli teaches a “benzoyl derivative of ribofuranose.” (Office Action, page 8). Specifically, Piccirilli discloses 1,2,3,5-tetra-O-benzoyl-2-C-methyl-β-

D-ribofuranose. Instant claims 36 recites, *inter alia*, 1,2,3,5-tetra-O-benzoyl-2-C-methyl- β -D-ribofuranose. The Examiner provides no explanation why the disclosure of this compound renders the instant claims obvious in view of the four other cited references. Applicants respectfully point out that the Examiner has the burden of putting forth arguments as to why the claims at issue are obvious. See *KSR*, *slip op.* p. 15 (“important to *identify a reason* that would have prompted a person of ordinary skill...to combine the elements in the way the claimed new invention does.”); see also USPTO Memorandum (“it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed.”). The mere fact that Piccirilli teaches a compound disclosed in instant claim 36 does not render claim 36, or any other claim, obvious. 1,2,3,5-tetra-O-benzoyl-2-C-methyl- β -D-ribofuranose is merely one of many elements recited in the instant claims, and Piccirilli in view of BeMiller, Merck, Sundberg and McFarlin does not disclose each element of the processes of the instant claims.

In *KSR*, the references cited by the Examiner provided the patentee with all the elements of the claimed invention—the claimed invention was obtained merely by combining the references “like pieces of a puzzle.” *KSR*, *slip op.*, pp. 16-17. As demonstrated above, the instant case is distinguishable because the five references cited by the Examiner do not provide each element of the instant claims. Therefore, because the references cited by the Examiner, individually or in combination, do not disclose the processes of the instant claims, and because substantial differences exist between the instant claims and the teachings of these references, the instant claims are not obvious.

D. The teachings of the references cited by the Examiner would not prompt a person of ordinary skill to combine the elements to arrive at the processes of the instant claims.

In *KSR*, the Supreme Court emphasized that the “combination of familiar elements according to known methods is likely to be obvious when it yields no more than predictable results.” *KSR*, *slip op.* p. 12. However, the Court cautioned that “[f]ollowing these principles may be more difficult in other cases...because the claimed subject matter may involve more than the simple substitution of one known element for another....” *Id.*, *slip op.* p. 14. Further, “it can be important to *identify a reason* that would have prompted a person of ordinary skill...to combine the elements in the way the claimed new invention does.” *Id.*, *slip op.* p. 15 (emphasis added); see also USPTO Memorandum (“it remains necessary to identify the reason why a

person of ordinary skill in the art would have combined the prior art elements in the manner claimed.”).

As established above, the instant case involves more than the “simple substitution” of known elements in the prior art. Therefore, the Examiner must provide a reason why one of ordinary skill in the art would combine the teachings of Piccirilli, BeMiller, Merck, Sundberg and McFarlin and somehow arrive at the processes of the instant claims. Because the references cited by the Examiner do not disclose each element of the instant claims, the Examiner must articulate a reason why one of ordinary skill in the art would combine these references to arrive at the processes of the instant claims. *KSR, slip op.* p. 15; *see also* USPTO Memorandum. Because the Examiner has not met this burden, the instant claims are not obvious. Accordingly, withdrawal of the rejection under 35 U.S.C. § 103(a) is respectfully requested.

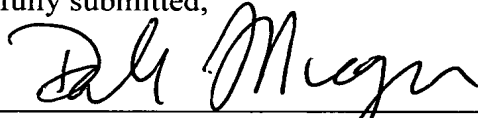
CONCLUSION

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

Please apply fees for the extension of time for three months (\$1010.00) and any other charges, or any credits, to Jones Day Deposit Account No. 503013.

If the Examiner believes it would be useful to advance prosecution, the Examiner is invited to telephone the undersigned at (858) 314-1200.

Respectfully submitted,



Date: May 23, 2007

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